WHAT IS CLAIMED IS: A brokerage System

1. A broker for multi-party constrained optimization, the broker operable to:

access a first optimization problem and a first value corresponding to a first party to a negotiation, the first optimization problem comprising at least one first objective to which the first value relates;

access a second optimization problem and a second value corresponding to a second party to the negotiation, the second optimization problem comprising at least one second objective to which the second value relates; and

generate a global optimization problem in accordance with the first and second optimization problems and the first and second values.

2. The broker of Claim 1, wherein the first optimization problem is received from the first party and comprises at least a portion of a constrained optimization problem (COP) for the first party, the COP comprising at least the first objective.

3. The broker of Claim 2, wherein the COP further comprises at least one constraint relating to one or more global variables.

4. The broker of Claim 1, wherein at least the first value is selected from the group consisting of:

a threshold value received from the first party; and

an optimal value generated according to the first optimization problem, the first optimization problem being received from the first party.

5. The broker of Claim 1, wherein the broker is operable to generate the global optimization problem as a linear program (LP).

6. The broker of Claim 1, further operable to generate a global solution to the global optimization problem, the global solution comprising a first solution value for the first objective which satisfies the first value and a second solution value for the second objective which satisfies the second value.

7.   The broker of Claim 6, further operable to generate the global solution as a Pareto-optimal solution.

8.   The broker of Claim 7, further operable to generate the global solution as a
fair solution according to one or more fairness criteria.

9.   The broker of Claim 8, wherein the fairness criteria are selected from the group consisting of:

an equal distribution criterion;

a geometric distribution criterion;

a weighted distribution criterion;

a weighted geometric distribution criterion; and

a minimum deviation from optimal criterion.

10.   The broker of Claim 6, wherein the broker is further operable to access an additional first value for the first party, access an additional second value for the second party, and generate an additional global solution satisfying the first and second values.

11.   The broker of Claim 6, further operable to:

communicate one or more global solutions to the first and second parties;

receive filtering information from the first and second parties;

use the filtering information to determine one or more filtered solutions from among the global solutions according to a filtering approach.

12.   The broker of Claim 11, wherein the filtering approach is selected from the group consisting of:

a veto approach;

a Pareto-optimal ranking approach;

an optimal weighted preferences approach; and

a mixed approach combining two or more of the above.

13.   The broker of Claim 6, further operable to:

communicate one or more solutions to the first and second parties;

receive selection information from the first and second parties;

use the selection information to determine a selected solution from among the solutions according to a selection approach.

14. _   The broker of Claim 13, wherein the selection approach is selected from the group consisting of:

an auction approach; and

a random selection approach.

10

15.   The broker of Claim 1, further operable to mediate at least a portion of a negotiation between the first party and a third party substantially simultaneously with the negotiation between the first party and the second party.

15

16.   The broker of Claim 1, wherein the broker comprises a computer system.

20

17.   A method for multi-party constrained optimization, comprising:

· accessing a first optimization problem and a first value corresponding to a first party to a negotiation, the first optimization problem comprising at least one first objective to which the first value relates;

· accessing a second optimization problem and a second value corresponding to a second party to the negotiation, the second optimization problem comprising at least one second objective to which the second value relates; and

. generating at least one global optimization problem according to the first and second optimization problems and the first and second values.

18.   The method of Claim 17, further comprising receiving the first optimization problem from the first party, the first optimization problem comprising at least a portion of a constrained optimization problem (COP) for the first party, the COP comprising at least the first objective.

19.   The method of Claim 18, wherein the COP further comprises at least one constraint relating to one or more global variables.

20.   The method of Claim 17, wherein at least the first value is selected from the group consisting of:

. a threshold value received from the first party; and

. an optimal value generated according to the first optimization problem, the first optimization problem being received from the first party..

21.   The method of Claim 17, wherein the global optimization problem is generated as a linear program (LP).

22.   The method of Claim 17, further comprising generating a global solution to the global optimization problem, the global solution comprising a first solution value for the first objective which satisfies the first value and a second solution value for the second objective which satisfies the second value.

23.   The method of Claim 22, wherein the global solution is generated as a Pareto-optimal solution.

24.   The method of Claim 22, wherein the global solution is generated as a fair solution according to one or more fairness criteria.

25.   The method of Claim 24, wherein the fairness criteria are selected from the group consisting of:

     an equal distribution criterion;

     a geometric distribution criterion;

     a weighted distribution criterion;

     a weighted geometric distribution criterion; and

     a minimum deviation from optimal criterion.

26.   The method of Claim 22, further comprising:

     accessing an additional first value for the first party;

     accessing an additional second value for the second party; and

     generating an additional global solution satisfying the first and second values.

27.   The method of Claim 22, further comprising:

     communicating one or more global solutions to the first and second parties;

     receiving filtering information from the first and second parties;

     using the filtering information to determine one or more filtered solutions from among the global solutions according to a filtering approach.

28.   The method of Claim 27, wherein the filtering approach is selected from the group consisting of:

     a veto approach;

     a Pareto-optimal ranking approach;

     an optimal weighted preferences approach; and

     a mixed approach combining two or more of the above.

29.   The method of Claim 22, further comprising:

communicating one or more solutions to the first and second parties;

receiving selection information from the first and second parties;

use the selection information to determine a selected solution from among the

5   solutions according to a selection approach.

30.   The method of Claim 29, wherein the selection approach is selected from the group consisting of:

an auction approach; and

a random selection approach.

10

31.   The method of Claim 17, further comprising mediating at least a portion of a negotiation between the first party and a third party substantially simultaneously with the negotiation between the first party and the second party.

15

32.   The method of Claim 17, wherein the method is implemented on one or more computer systems.

33. Software for multi-party constrained optimization, the software embodied in a computer-readable medium and operable to:

access a first optimization problem and a first value corresponding to a first party to a negotiation, the first optimization problem comprising at least one first objective to which the first value relates;

access a second optimization problem and a second value corresponding to a second party to the negotiation, the second optimization problem comprising at least one second objective to which the second value relates; and

generate a global optimization problem in accordance with the first and second optimization problems and the first and second values.

34. The software of Claim 33, wherein the first optimization problem is received from the first party and comprises at least a portion of a constrained optimization problem (COP) for the first party, the COP comprising at least the first objective.

35. The software of Claim 34, wherein the COP further comprises at least one constraint relating to one or more global variables.

36. The software of Claim 33, wherein at least the first value is selected from the group consisting of:

a threshold value received from the first party; and

an optimal value generated according to the first optimization problem, the first optimization problem being received from the first party.

37. The software of Claim 33, wherein the software is operable to generate the global optimization problem as a linear program (LP).

38. The software of Claim 33, further operable to generate a global solution to the global optimization problem, the global solution comprising a first solution value for the first objective which satisfies the first value and a second solution value for the second objective which satisfies the second value.

39.   The software of Claim 38, further operable to generate the global solution as a Pareto-optimal solution.

5   40.   The software of Claim 38, further operable to generate the global solution as a fair solution according to one or more fairness criteria.

41.   The software of Claim 40, wherein the fairness criteria are selected from the group consisting of:

10   an equal distribution criterion;

a geometric distribution criterion;

a weighted distribution criterion;

a weighted geometric distribution criterion; and

a minimum deviation from optimal criterion.

15   42.   The software of Claim 38, further operable to access an additional first value from the first party, access an additional second value from the second party, and generate an additional global solution satisfying the first and second values.

20   43.   The software of Claim 38, further operable to:

communicate one or more global solutions to the first and second parties;

receive filtering information from the first and second parties;

use the filtering information to determine one or more filtered solutions from among the global solutions according to a filtering approach.

25   44.   The software of Claim 43, wherein the filtering approach is selected from the group consisting of:

a veto approach;

a Pareto-optimal ranking approach;

30   an optimal weighted preferences approach; and

a mixed approach combining two or more of the above.

25

45.   The software of Claim 38, further operable to:

communicate one or more solutions to the first and second parties;

receive selection information from the first and second parties;

use the selection information to determine a selected solution from among the

5   solutions according to a selection approach.

46.   The software of Claim 45, wherein the selection approach is selected from the group consisting of:

an auction approach; and

10   a random selection approach.

47.   The software of Claim 33, further operable to mediate at least a portion of a negotiation between the first party and a third party substantially simultaneously with the negotiation between the first party and the second party.

15